Relationships among non-mainstream American English, vocabulary size, and lexical processing in preschool-aged children

Ruby-Louise Braxton & Jan Edwards, University of Wisconsin-Madison

BACKGROUND

Rationale

- Children who speak Nonmainstream American English (NMAE) are at risk of being misdiagnosed with a speech and/or language disorder at higher rates.
- Many studies have examined the use of NMAE, but have found conflicting results regarding how dialect use can influence later academic success.
- Some of these conflicting results may be because NMAE means different things in preschool-age and school-age children.
  - Preschool-age children: High dialect use = Good learner of native dialect.
  - School-age children: High dialect use = Poor dialect shifter.

Purpose of this study

- To investigate the relationship among dialect density, expressive vocabulary, and lexical processing speed in preschool-age children who speak African American English (AAE).
  - An eye-tracking task based on the looking while listening (LWL) paradigm (Fernald et al. 2008) was used to examine lexical processing efficiency in this group of children.

Research Questions

1. What is the relationship among dialect density, vocabulary size, lexical processing efficiency, and age?
2. Can measures of dialect density be differentiated from measures of language development in preschool children?

METHODS

Participants

- 32 African American preschoolers (14 boys, 18 girls) from Madison, Wisconsin.
- Aged 2;4 – 5;11
- Typically developing per parental report; none receiving special education services at the time of testing.
- Each child passed a bilateral hearing screening.

Table 1 . Demographic information for participants.

Age	Maternal Education[1]	Total Family Income	EVT-2 Standard Score	PPVT-4 Standard Score
46.09 (10.58)	2.84 (1.25)	1.214 (0.5)	93 (10)	92 (11)
Range: 28-69	Range: 1-4	Range: 1-3	Range: 67-119	Range: 70-131

6-step scale for education:
1 = less than high school degree
2 = GED
3 = high school degree
4 = some college
5 = college degree
6 = post-graduate degree

5-step scale for family income:
1 = below $20,000/year
2 = $20,000 to $40,000/year
3 = $41,000 to $60,000/year
4 = $61,000 to $100,000/year
5 = above $100,000/year

Stimuli for LWL task

Words
- Stimulus words chosen based on age of acquisition and pictureability.
- All target words paired with semantic, phonological, and unrelated foils.
- Target words and all phrases *(find the, see the, isn't this fun*, etc.) recorded in African American English (AAE)
- Stimuli presented to children in their native dialect of AAE

Pictures
- Color photographs of target objects.
- Pictures were normed for comprehension in a Head Start classroom.
- Pictures used only if recognized by 80% of children.

PROCEDURE AND ANALYSIS

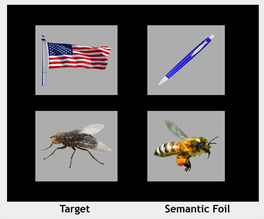


Figure 1. Sample of a stimulus presentation. Four images are presented: fly(target); bee (semantic foil); flag (phonological foil); pen (unrelated).

Eye Tracking Procedure and Analysis

- Target, Semantic Foil, Phonological Foil, and Unrelated Foil.
- Identified four area of interest (AOI's) and coded looks to target and phonological, semantic, and unrelated foils.
- Time range analyzed = 250 ms to 1750 ms (1500 ms total).
- **Accuracy**: looking duration to the target relative to the total duration of interest (1500 ms).

Language Sampling Procedure and Analysis

- Collected during adult-child discourse with an African American female examiner speaking AAE during free play context.
- Last 50 utterances transcribed orthographically and analyzed for total number of words, morphosyntactic and phonological AAE features.
- Morphosyntactic density, phonological dialect density, and overall dialect density calculated (number of dialect features/total number of words).

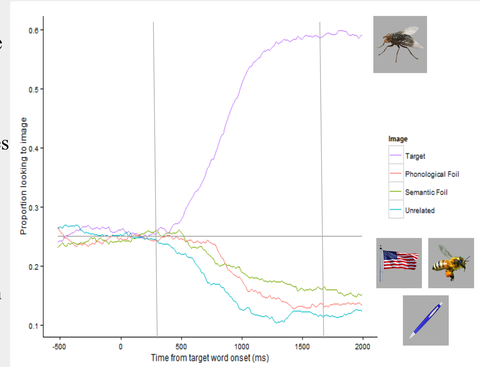
Statistical Analysis

Regression analyses used to examine relationship among dialect density, vocabulary size, and lexical processing efficiency:
- Dependent variables: LWL mean accuracy or receptive/expressive vocabulary size
- Independent variables: age, dialect density

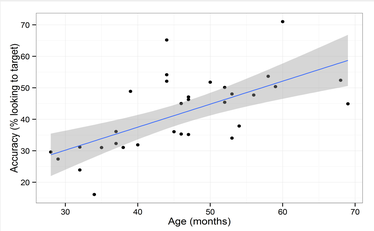
EYE TRACKING RESULTS

- Average (across all trials and subjects) looks to target over time for the target pictures the three foils.
- Baseline (before word onset at 0 ms), looks for all four image-types were about 25%. No one image was more interesting than the others.
- Around 250 ms, children began looking at the target word
- As time goes on, overall, children spent more time looking to the target word rather than the foils.

Average looks to target word and three foils over time

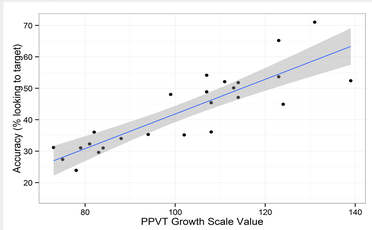


Relationship among LWL accuracy, age, and dialect density



- LWL mean accuracy and age: r^2=0.43, p<.001
- Dialect density was not a significant predictor of LWL accuracy

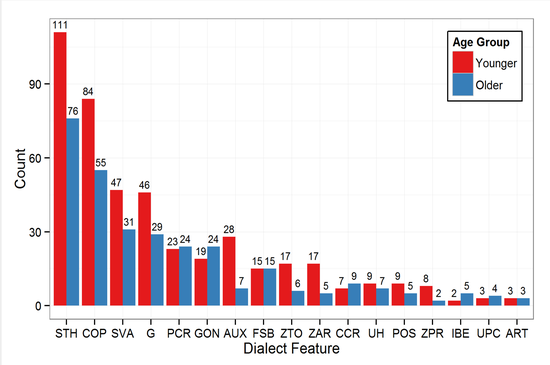
Relationship among vocabulary, dialect density, and LWL accuracy



- Receptive vocabulary size and LWL accuracy: r^2=0.75, p < .001
- Dialect density was not a significant predictor of receptive vocabulary size.

DIALECT DENSITY RESULTS

Use of dialect features by age group



Median split by age:
- 17 participants in the younger group (age > 46 months)
- 15 participants in the older group (age < 47 months)

Mean dialect density

Type of dialect density	Mean	SD
Morphosyntactic	0.07	0.044
Phonological	0.06	0.043
Non-age sensitive	0.12	0.07
Overall	0.13	0.07

Relationship between DD and age
- Significant negative correlation between age and overall dialect density; age and morphological dialect density, and age and "non-age sensitive" measure of dialect density.
- No significant correlation between age and phonological dialect density.

Feature use differences between age groups

Dialect features	Younger (>46 months) (n = 17)	Older (<47 months) (n = 15)	% change in use as age increases
ART	3	3	0% change
COP	84	55	35% decrease
FSB	15	15	0% change
IBE	2	5	60% increase
SVA	47	31	34% decrease
UPC	3	4	25% increase
CCR	7	9	22% increase
G	46	29	37% decrease
PCR	23	24	4% increase
STH	111	76	32% decrease
GON	19	24	21% increase
UH	9	7	22% decrease

- Features that decreased by less than 40%, increased, or stayed the same were used to calculate a revised **non-age sensitive measure of dialect density**.
- Features with a decrease of more than 40% between younger and older group were assumed to be due to language development.

DISCUSSION

Conclusions/Clinical Implications:

- Limitations of study:
  - Language samples were short (only 50 utterances).
  - Receptive and expressive vocabulary evaluated, but no measures of receptive or expressive syntax.
- Can we even measure dialect density in preschool-aged children?
  - At this age, it is difficult to differentiate between language development and dialect use.
- Vocabulary size and lexical processing efficiency were related to each other, but neither was related to dialect density.
  - Once age was taken into account, dialect density was *not* a significant predictor for any variables of interest.
- Although most of the children in this study would not be considered language impaired, many children scored below average on vocabulary when compared to their peers.
  - As vocabulary size increased, children processed even highly familiar words more accurately.
  - Processing familiar words less accurately puts these children at a disadvantage for language acquisition and general learning.
- Therapy should focus on improving vocabulary, rather than modifying the use of dialectal features, which will help to improve lexical processing efficiency overall.
- Future Directions:
  - Calculate MLU % obligatory use of morphological dialect features.

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